2013 Pipeline Performance Summary

BC Oil and Gas Commission

Table of Contents

BC Oil and Gas Commission	2
Purpose	3
Pipeline Regulation	4
Pipeline Inventory	5
Integrity Management Programs	7
Pipeline Emergency Requirements	8
Pipeline Incidents	9
Incident Causes	10
Product Releases	13
Moving Forward	14
Appendix 1 – 2013 Pipeline Incidents	15

About the

BC Oil and Gas Commission

The BC Oil and Gas Commission is the provincial regulatory agency with responsibilities for regulating oil and gas activities in British Columbia, including exploration, development, pipeline transportation and reclamation.

The Commission's core services include reviewing and assessing applications for industry activity, consulting with First Nations, cooperating with partner agencies, and ensuring industry complies with provincial legislation and all regulatory requirements. The public interest is protected by ensuring public safety, respecting those affected by oil and gas activities, conserving the environment, and ensuring equitable participation in production.

For general information about the Commission, please visit www.bcogc.ca or phone 250-794-5200.

Mission

We regulate oil and gas activities for the benefit of British Columbians.

We achieve this by:

- Protecting public safety,
- Respecting those affected by oil and gas activities,
- Conserving the environment, and
- Supporting resource development.

Through the active engagement of our stakeholders and partners, we provide fair and timely decisions within our regulatory framework.

We support opportunities for employee growth, recognize individual and group contributions, demonstrate accountability at all levels, and instill pride and confidence in our organization.

We serve with a passion for excellence.

Vision

To be the leading oil and gas regulator in Canada.

Values

Respectful
Accountable
Effective
Efficient
Responsive
Transparent

Purpose

Pipelines are recognized as a safe and economical mode of transportation, and secure operation is essential to protecting public safety and the environment. British Columbia's oil and gas industry depends on pipelines for the distribution of such products as natural gas, water and oil.

The BC Oil and Gas Commission (Commission) regulates over 40,000 kilometres of pipelines in the province. Over 80 per cent of these pipelines transport natural gas, while only six per cent carry oil. The remainder carrry water or other gases or liquids.

This report provides a statistical overview of pipelines regulated by the BC Oil and Gas Commission (Commission) in the 2013 calendar year. It includes data on types of pipelines, their lengths, uses and overall incident rates. It also summarizes the Integrity Management Program, which ensures operators properly test and maintain pipelines to mitigate potential integrity issues.

Appendix 1 summarizes the 38 pipeline incidents that occurred in 2013. However, not all led to the release of a product. In the event of an incident a pipeline is shut down immediately, and the Commission ensures both it is fixed before going back into operation, and that the site has been completely remediated if there was a release.

2013 AT A GLANCE

40,392 km of pipelines regulated

82% natural gas

New pipelines: **267 km**

0.94 incidents per 1,000 kms

8 offices across B.C. to ensure fast response

Pipeline Regulation

The Commission's jurisdiction extends to the majority of pipelines in British Columbia, as defined in legislation through the Oil and Gas Activities Act (OGAA). Activities regulated by the Commission extend throughout a pipeline's lifecycle, including permitting, construction, operation, maintenance and abandonment. Pipelines not regulated by the Commission, which include those crossing provincial and/or national borders and gas utility pipelines, are not addressed in this report.

Pipelines are regulated under the Pipeline and Liquefied Natural Gas Facility Regulation (PLNGFR)[1], which states they must be operated and maintained in accordance with CSA Z662 – Oil and Gas Pipeline Systems. CSA Z662 is a national standard developed and maintained by the Canadian Standards Association and covers the design, construction, operation and maintenance of oil and gas industry pipeline systems. It is required under OGAA that operators meet this standard. Other applicable regulations include the Environmental Protection and Management Regulation and Consultation and Notification Regulation.

Pipelines Defined

Pipelines regulated by the Commission are defined by legislation in OGAA. "Pipeline" refers to, except in Section 9 of OGAA, piping through which any of the following are transported:

- Petroleum or natural gas.
- Water produced in relation to the production of petroleum or natural gas, or conveyed to or from a facility for disposal into a pool or storage reservoir.
- Solids.
- Substances prescribed under Section 133(2)(v) of the Petroleum and Natural Gas Act.
- Other prescribed substances.

The scope of the definition also includes installations and facilities associated with the piping, but does not include:

- Piping used to transmit natural gas at less than 700 kilopascals (kPa) to consumers by a gas utility as defined in the Gas Utility Act.
- A wellhead.
- Anything else that is prescribed.

1 For pipelines, the PLNGFR was replaced by the Pipeline Regulation in 2014.

Pipeline Inventory

The Commission regulates 40,392 kilometres (km) of pipelines in British Columbia, which transport a variety of refined and unrefined products including natural gas, sour natural gas, crude oil, water, high vapour pressure (HVP) hydrocarbons and other miscellaneous gases and oil effluent.

Table 1 (next page) shows a net addition of 267 km of total registered pipelines went into operation in 2013. The highest increase was sour gas pipelines, mainly due to operators amending lines to flow sour gas, and secondly to the installation of new lines. The net decrease in the length of sweet gas pipelines was due to abandonment of older lines and changes of service to flow sour gas.

Classifications of Pipelines

Abandoned
Pipelines removed from service and not maintained for later return to service.

Deactivated
Pipelines removed from service but maintained for later return to service.

Operating
Pipelines actively used for the transport of fluids related to oil and gas operations, and piping that has been suspended from service for less than 18 months but not formally deactivated.

Classifications of Products

Sour Natural Gas – natural gas with a hydrogen sulphide (H_2S) partial pressure greater than 0.3 kilopascals.

Natural Gas – natural gas, sweet gas and fuel gas.

Crude Oil – crude oil, sour crude and low vapour-pressure hydrocarbons.

Water – freshwater, produced water, saltwater and sour water.

High-Vapour Pressure – ethylene, propane, pentanes and liquid ethane.

Other – miscellaneous gases and liquids, condensate and oil emulsion/effluent.

Table 1: Total lengths of pipelines by type and status (in kilometres)*

	2012				2013			
Type	**Total**	**Operating**	**Deactivated**	**Abandoned**	**Total**	**Operating**	**Deactivated**	**Abandoned**
Natural Gas	18,125	17,306	333	486	20,176	19,017	593	566
Sour Natural Gas	12,708	12,040	442	226	12,951	12,104	596	251
Water	2,187	2,039	122	26	2,594	2,398	55	141
Crude Oil	2,019	1,855	84	80	2,397	2,159	158	80
Other	4,821	4,585	75	161	2,009	1,818	130	61
HVP	265	211	44	10	265	209	10	46
Total	**40,125**	**38,036**	**1,100**	**989**	**40,392**	**37,705**	**1,542**	**1,145**

*Note: As part of the Commission's ongoing commitment to data integrity, some product types were reviewed and updated in 2013 to more accurately reflect actual pipeline fluids. As such, changes in pipe length by product are reflected here. For example, "Other – Abandoned" saw a decrease from 161 in 2012 to 61 in 2013, reflecting clarification of the 'Other' product to water, effluent or another fluid.

Integrity Management Programs

The Integrity Management Program (IMP) is a systematic approach to assure the integrity of pipelines throughout their entire lifecycles. By closely monitoring for conditions that may lead to integrity issues, such as corrosion or cracking, operators are able to address potential issues before they arise. Operational phases identified under the IMP include pipeline design, construction, operation and maintenance, as well as the effective management of hazards.

As per Section 7 of the PLNGFR, every permit holder designing, constructing, operating, maintaining or abandoning pipeline infrastructure in British Columbia must have an IMP. Permit holders are required to follow the current version of CSA Z662, including Annex N. Annex N provides guidelines for developing, documenting and implementing an IMP to provide safe, environmentally responsible and reliable service.

In 2011 the Commission initiated a compliance assessment of all IMPs in the province. Twenty-eight permit holders were selected to participate in 2013, with 19 completing the process. The remainder no longer had operating assets in British Columbia, or ceased to exist as independent entities due to mergers or acquisitions. In the latter case, the new company would still be required to complete an assessment. In total, 51 companies have been assessed since 2011, and all are expected to be completed by 2015.

Companies under assessment first complete self-assessment reports, which are reviewed by the Commission's pipeline engineering department. The Commission then conducts detailed assessment meetings with permit holders and provides results through final assessment reports. Any deficiencies or issues of nonconformance are required to be fixed immediately by operators to ensure compliance.

IMP Process Steps

1. Selection of operators
2. Notification and invite to kick-off meeting
3. Kick-off meeting
4. Submission of Self-Assessment Protocol (SAP) and other manuals
5. Review of SAP and IMP manuals
6. Assessment meetings
7. Compilation and submission of Final Assessment Report (FAR)
8. Submission of corrective actions and follow-ups
9. Assessment closing letter

Pipeline Emergency Requirements

Section 37 of OGAA states an operator or person carrying out an oil and gas activity must prevent spillage and promptly report any damage or malfunction that could cause spillage to the Commission. Section 38 contains a provision whereby the permit holder must prepare and maintain an emergency response program and response contingency plan approved by the Commission.

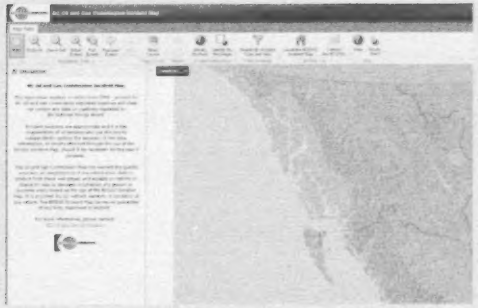
If spillage occurs, the following actions must be taken:

- Remedy the cause or source of the spillage.
- Contain and eliminate the spillage.
- Remediate any land or water affected by the spillage.
- Report the location and severity of the spill and any damage or malfunction to the Commission.

A person who is aware that spillage is occurring, or may occur, must take reasonable efforts to assist in containing or preventing the spillage. Assistance can be provided by calling the operating company indicated on signs identifying the location of the pipeline, or by calling the Commission's 24/7 emergency phone line. Depending on the level of the incident, the Commission may respond with trained personnel to ensure any risks are mitigated.

Permit holders must prepare and maintain emergency response programs and response contingency plans and update them annually. The Commission regularly audits these programs and may also oversee emergency exercises. Failure to satisfactorily meet these requirements can result in compliance and enforcement actions, which may include fines or shutting-in a pipeline system.

BCOGC Incident Map



In 2014 the Commission launched the BCOGC Incident Map, which is an interactive web-based map showing where pipeline incidents have occurred from 2000 to current. The Commission is committed to full public transparency and this tool provides timely, factual information on all pipeline incidents. By clicking on any identified point on the map, results will be displayed on the left hand side navigation bar. You can then click on the results and a table will display more information.

Pipeline Incidents

In 2013 there were 38 incidents on pipelines regulated by the Commission. Table 2 shows an overall incident frequency in 2013 of 0.94 for every 1,000 km of pipelines, a slight increase from 0.67 in 2012 and 0.87 in 2011. See Appendix 1 for a list of 2013 incidents.

Not all pipeline incidents result in spills. In 2010 the implementation of OGAA led to broader reporting criteria, meaning all incidents, including those that have the potential to affect the integrity of a pipeline but did not cause spillage, must be reported.

Table 3 shows sour natural gas pipelines had the lowest incident rate with a frequency of 0.15 per 1,000 kilometres, not including the zero incidents on HVP pipelines. Pipelines classified as "other" had the highest incident frequency at 4.48, and water pipelines recorded the second highest at 3.08. The majority of incidents related to "other" pipelines involved suspended or abandoned pipelines, and due to their inactivity any product releases were minimal, if any, and mostly attributed to water and air.

Table 2: Total number of incidents per 1,000 km of pipeline inventory

	2009	2010	2011	2012	2013
Length of Pipelines (km)	35,868	37,474	39,023	40,125	40,392
Number of Incidents	37	50	34	27	38
Incident Frequency (Incidents/1,000 km)	1.03	1.38	0.87	0.67	0.94

Table 3: Total number of incidents per 1,000 km of pipeline inventory in 2013

Type of Pipeline	Length of Pipeline (km)	# of Incidents	Frequency (per 1,000km)
Sour Natural Gas	12,951	2	0.15
Natural Gas	20,176	15	0.74
Crude Oil	2,397	4	1.67
Water	2,594	8	3.08
HVP	265	0	0.00
Other	2,009	9	4.48

All incidents are responded to by the Commission and assessed to determine what remedial actions must be taken and whether the pipeline can continue to operate. If required, the Commission will issue orders to the permit holder for remedial actions.

After an incident, the permit holder must submit a post-incident report summarizing the root cause of the incident, repair methods, operational changes and design changes that may be required. The Commission then conducts an investigation to determine the causes and contributing factors, and any remedial actions and/or repairs are identified in order to prevent a recurrence. Based on the results of these investigations, the Commission may issue recommendations to industry as a whole.

Incident Causes

Table 4 (next page) shows metal loss was the leading cause of pipeline failures in 2013 contributing to 22 incidents, and of those, external corrosion was the leading cause at 12 incidents. External interference was the second leading cause of failures contributing to nine incidents, most caused by third-party interference.

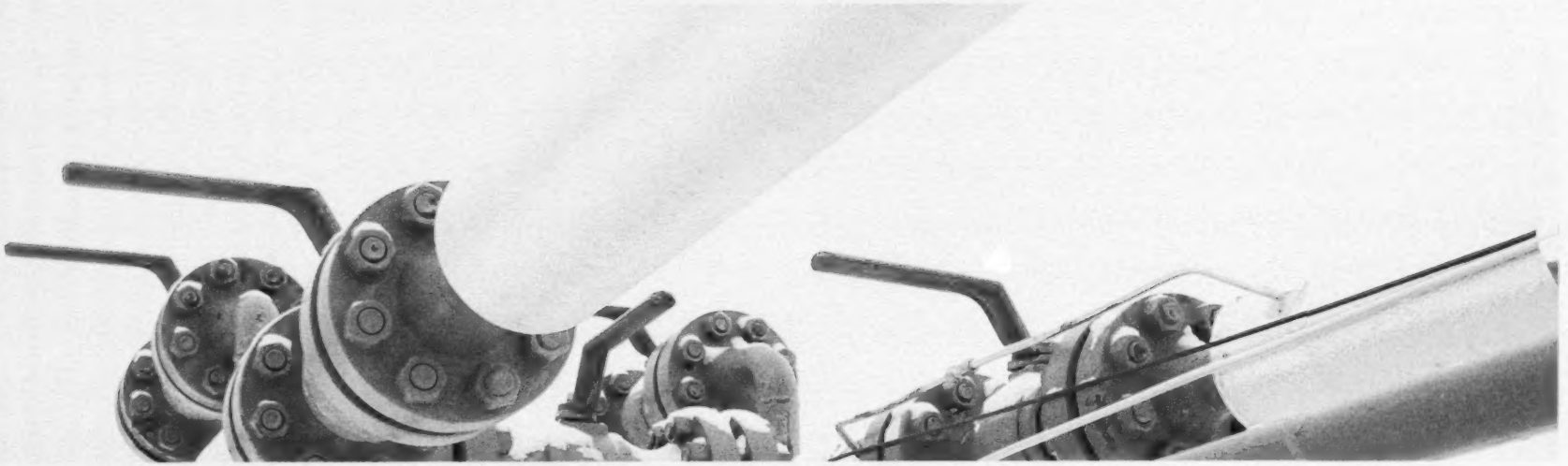
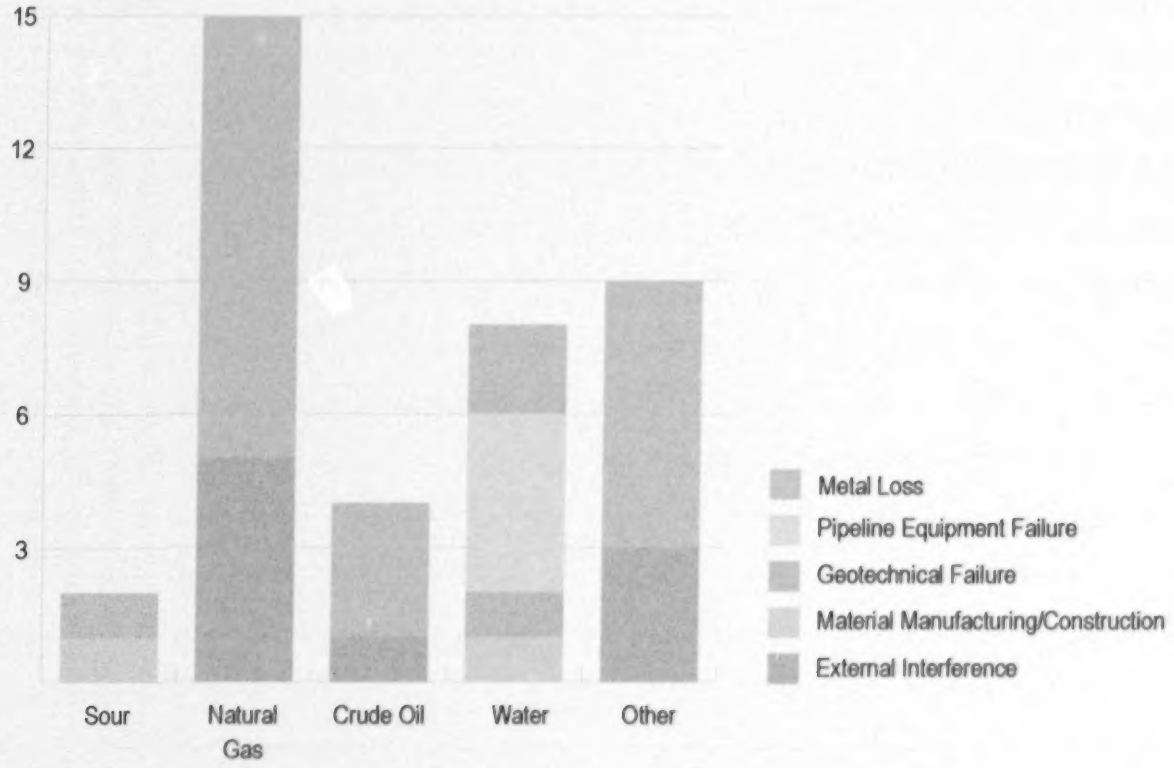


Table 4: Classification of Pipeline Failures

Incident Cause	2011	2012	2013	Definition
Metal Loss				Wall thickness reduction (due to, for example, corrosion).
Internal Corrosion	10	5	4	Loss from internal surface of pipe body or weld due, for example to corrosion or erosion.
External Corrosion	5	6	12	Loss from external surface of pipe body or weld due, for example to corrosion or erosion..
Suspected Corrosion	2	1	6	Most likely due to corrosion although internal/external corrosion has not been confirmed.
Total	**17**	**12**	**22**	
Pipeline/Equipment Failure				
Cracking in Pipe	0	1	0	Mechanically driven or environmentally assisted cracking of the pipe.
Pipe Fittings / Joint Failure	6	4	4	Failure in valve, weld, flange, etc.
Miscellaneous Equipment	0	1	0	Failure in the tank, compressor, site seeing glass, etc.
Total	**6**	**6**	**4**	
External Interference				External activities causing damage to pipe.
Third Party Interference	1	2	5	Interference by someone other than operating company or its employees/contractors.
Company	5	1	4	Interference by operating company or its employees/contractors.
Vandalism	0	0	0	Interference caused willfully by someone through attempted theft of service fluid.
Total	**6**	**3**	**9**	
Material Manufacturing or Construction	**2**	**0**	**2**	Defects in the fitting, construction or components.
Geotechnical Failure	**2**	**4**	**1**	Loss of integrity due to geotechnical effect, for example, slope movement or weather.
Other Causes				Other causes not included in previous definitions.
Improper Operation	1	2	0	Decision error made by operating company during service..
Overpressure	0	0	0	Failure caused due to overpressure of pipe.
Total	**1**	**2**	**0**	
Total Incidents	**34**	**27**	**38**	

Figure 3 shows the number of incidents in relation to pipeline type for 2013. These are overall numbers, and not adjusted to reflect lengths of pipelines. Metal loss was the major cause of failure of all types of pipelines except for water pipelines.

Figure 3: 2013 Incident Cause by Pipeline Type



Product Releases

Table 5 shows the largest reported liquid release in 2013 was 3,200 cubic metres (m^3) of fresh water. This incident was caused by a section of pipe bursting due to freezing temperatures. The "other" liquids spilled included nitrogen, condensate and oil emulsion/effluent. Any time there is a liquid release, the Commission ensures it is completely remediated by the operator, and operations are not permitted to resume until all integrity issues are fixed.

Table 6 shows the largest reported gas release in 2013 was 4,500 cubic meters (m^3) of sweet natural gas. This incident was caused by a third party when its excavator struck a natural gas pipeline and pulled it out of the ground, causing the pipe to shear in half. The line was depressurized and the affected pipe was cut off and abandoned.

There was one natural gas leak of unknown volume that was discovered while an operator was conducting an annual pipeline inspection. This incident has been included in this report, but the spill volume has not been included in Table 6.

Table 5: Liquid Volume Released by Product in 2013

Spill Liquid	Volume (m^3)
Crude Oil	61
Produced Water	63.51
Freshwater	4,760
Other	402.32

Table 6: Gas Release Volume by Product in 2013

Spill Gas	Volume (m^3)
Sour Natural Gas	2,001
Natural Gas	14,260.5

Moving Forward

Looking ahead, the Commission is working to complete IMP compliance assessments for all B.C. operators by 2015, while continuing to engage with operators to improve the design, construction, operation and maintenance of pipelines, including older, legacy pipes that may not be constructed to the same standards of today.

The Commission recognizes the need for communication and transparency in regards to its role as a regulator of oil and gas activities and protecting public safety. Efforts will continue to enhance information and knowledge sharing between the Commission, public, stakeholders, engineers and experts.

More Information

Contact www.bcogc.ca

This summary was published in March 2015 and is updated annually. Previous pipeline performance summaries can be found here. For specific questions regarding this document please contact ogc.communications@bcogc.ca. For more information on pipelines see our:

- Pipeline Regulation
- Pipelines Fact Sheet
- Pipeline Permit Application Manual
- Pipeline Operations Manual

Appendix 1 – 2013 Pipeline Incidents

Date	Location	Fluid Type	Product Type	Volume (m^3)	Incident Type	Cause of Failure		Remediation
Jan. 11	Jedney Field	Other	Nitrogen Gas	0	Hit	External Interference	Third Party	No Release
Jan. 14	Hay Field	Water	Fresh Water	1,500	Leak	Metal Loss	Internal Corrosion	Yes
Jan. 29	Maxhamish Lake	Water	Produced Water	55	Leak	Material Manufacturing or Construction	Defective pipe body	Yes
Feb. 13	Prophet River	Natural Gas	Sweet Natural Gas	1,645	Hit	External Interference	Third Party	Yes
Feb. 13	Delta	Natural Gas	Sour Natural Gas	2,000	Leak	Material Manufacturing or Construction	Defective pipe body	Yes
Feb. 19	Birch Field	Water	50/50 methanol-water mixture	0.01	Leak	Cracking	Pipe Fittings / Joint Failure	Yes
Feb. 25	Helmut Field	Natural Gas	Sweet Natural Gas	0.2	Leak	External Interference	Employee or Contractor	Yes
Feb. 25	Siphon Field	Other	Nitrogen Gas	1	Leak	Metal Loss	Suspected Corrosion	Yes
Feb. 25	Siphon Field	Other	Nitrogen Gas	1	Leak	Metal Loss	Suspected Corrosion	Yes
Mar. 5	Langley	Natural Gas	Sweet Natural Gas	4,500	Hit	External Interference	Third Party	Yes
Mar. 6	Altares Field	Other	Not in Service	0	Hit	External Interference	Third Party	No Release
Mar. 21	Inga Field	Crude Oil	Crude Oil	60	Leak	Metal Loss	External Corrosion	Yes
Mar. 26	Kiskatinaw River	Water	Fresh Water	3,200	Rupture	Geotechnical Failure	Weather Related	Yes
Apr. 22	Fraser Lake	Natural Gas	Sweet Natural Gas	50	Leak	Metal Loss	External Corrosion	Yes

Date	Location	Fluid Type	Product Type	Volume (m^3)	Incident Type	Cause of Failure		Remediated
Apr. 30	Burnaby	Natural Gas	Sweet Natural Gas	1,286	Leak	Metal Loss	External Corrosion	Yes
May 18	Currant Field	Crude Oil	Crude Oil	0.5	Leak	Metal Loss	Internal Corrosion	Yes
June 6	Lapp Field	Other	Condensate & Corrosion Inhibitor	0.2	Leak	Metal Loss	Suspected Corrosion	Yes
June 11	Cecil Lake	Natural Gas	Sweet Natural Gas/Produced Water	0.3	Leak	Metal Loss	Internal Corrosion	Yes
June 27	Burnaby	Natural Gas	Sweet Natural Gas	2,148	Leak	Metal Loss	External Corrosion	Yes
June 27	Murphy Field	Other	Oil Well Effluent	0.02	Leak	Metal Loss	Suspected Corrosion	Yes
June 28	Boundary Field	Other	Produced Water/ Oil Emulsion	400	Leak	Metal Loss	Internal Corrosion	Yes
July 9	Groundbirch	Crude Oil	Crude Oil	0.5	Leak	Metal Loss	External Corrosion	Yes
July 12	Cypress Field	Natural Gas	Sour Natural Gas	1.0	Leak	Metal Loss	External Corrosion	Yes
July 17	West Vancouver	Natural Gas	Sweet Natural Gas	2,356	Leak	Metal Loss	External Corrosion	Yes
Aug. 8	Delta	Natural Gas	Sweet Natural Gas	734	Leak	Metal Loss	External Corrosion	Yes
Aug. 20	Delta	Natural Gas	Sweet Natural Gas	587	Leak	Metal Loss	External Corrosion	Yes
Aug. 23	Sunrise Field	Natural Gas	Sweet Natural Gas	0	Hit	External Interference	Employee or Contractor	No Release

Date	Location	Fluid Type	Product Type	Volume (m^3)	Incident Type	Cause of Failure		Remediated
Aug. 24	Kiwigana Field	Water	Salt Water	2.5	Rupture	Cracking	Pipe Fittings / Joint Failure	Yes
Aug. 27	Coquitlam	Natural Gas	Sweet Natural Gas	293	Leak	Metal Loss	External Corrosion	Yes
Sept. 3	Farrell Creek	Water	Fresh Water	60	Spill	Cracking	Pipe Fittings / Joint Failure	Yes
Sept. 5	Blueberry Field	Natural Gas	Sweet Natural Gas	n/a	Leak	Metal Loss	Suspected Corrosion	Yes
Sept. 12	Wonowon	Natural Gas	Sweet Natural Gas	0	Other	External Interference	Employee or Contractor	No Release
Sept. 12	Chetwynd	Crude Oil	Crude Oil	0	Hit	External Interference	Third Party	No Release
Sept. 18	Stoddart Field	Water	Produced Water	1	Leak	Metal Loss	External Corrosion	Yes
Sept. 25	Milliger Field	Other	Produced Water/ Oil Emulsion	0.05-0.1	Rupture	Metal Loss	Suspected Corrosion	Yes
Oct. 9	Burnaby	Natural Gas	Sweet Natural Gas	661	Leak	Metal Loss	External Corrosion	Yes
Oct. 16	Blair Creek	Other	No Release	0	Hit	External Interference	Employee or Contractor	No Release
Nov. 17	Parkland	Water	50/50 methanol-water mixture	5	Rupture	Cracking	Pipe Fittings / Joint Failure	Yes

BC Oil & Gas COMMISSION